

Virginia Class Attack Submarine – On Track to Deliver in 2004

Program Manager Interviews Navy Rear Adm. (Sel) Paul Sullivan

COLLIE J. JOHNSON

In the world of military program managers, Navy Rear Adm. (Sel) Paul Sullivan is an anomaly. In fact, he may just be one of the Navy's longest serving program managers. Where most military program managers serve three to four years, Sullivan has now been an ACAT I program manager for six years. He has managed the Virginia Class Attack Submarine project for three years. And before that, he managed the canceled *Seawolf* project for three and a half years. That's six years of managing an ACAT I program – years filled with briefings, milestones, negotiations, contract management, reporting, budgeting, scheduling, and testing – years that ultimately add up to a whole lot of unrelenting pressure and stress.

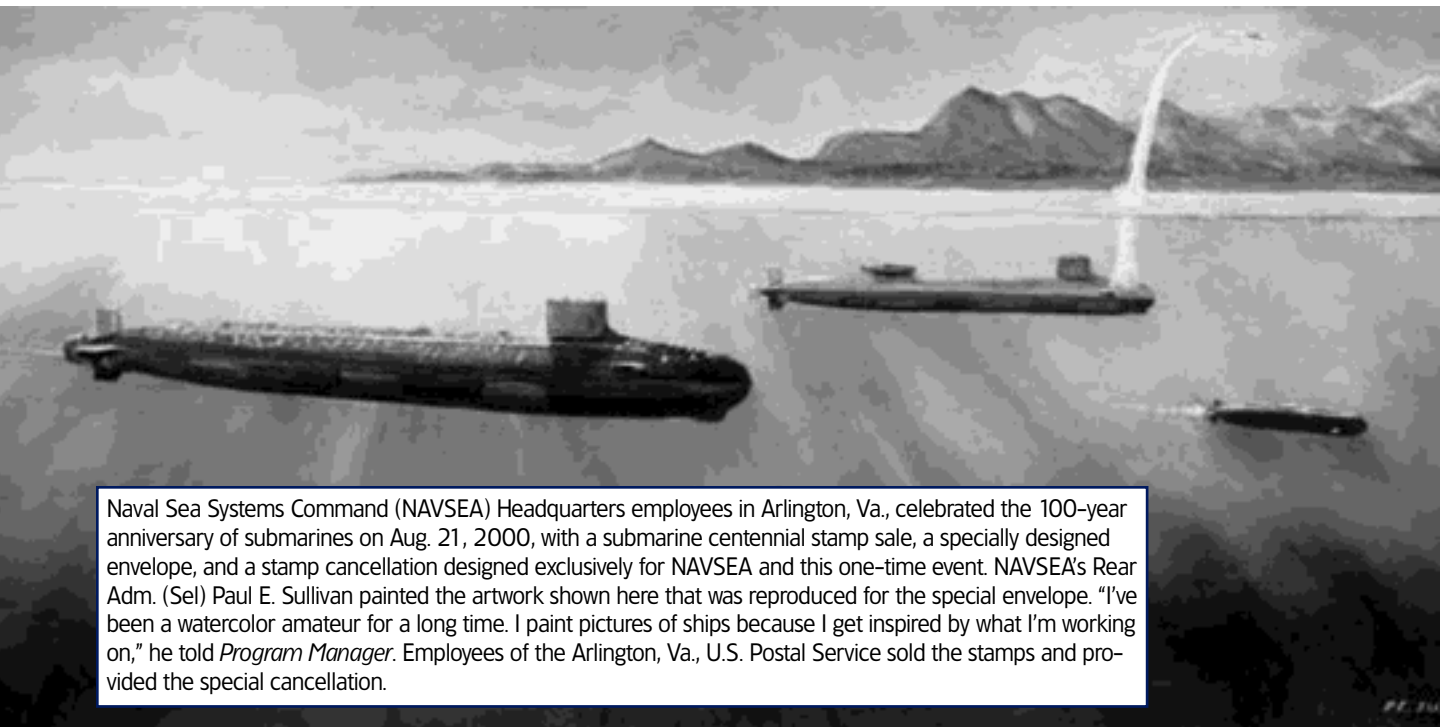
The Right Man for the Right Job

A look at his bio, however, reveals why DoD has left him on the job for so long. He's probably the best qualified man in the nation to manage the design and construction of what will surely become the world's most advanced attack submarine. A graduate of the Massachusetts Institute of Technology (MIT), with a master's in Naval Architecture and Marine Engineering and the advanced degree of Ocean Engineer, DoD nominated and sponsored Sullivan as an Associate Professor of Naval Architecture at MIT. There he taught the Naval Ship Design sequence of courses, and supervised numerous Navy students in their ship design projects and thesis work.

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“The combat system [of the Virginia Class] is impressive. Instead of having stand-alone or federated subsystems that may or may not talk to each other, we actually have 23 subsystems on this ship that all talk to each other over a wide area network. We’ve never done that on a submarine before.”



Naval Sea Systems Command (NAVSEA) Headquarters employees in Arlington, Va., celebrated the 100-year anniversary of submarines on Aug. 21, 2000, with a submarine centennial stamp sale, a specially designed envelope, and a stamp cancellation designed exclusively for NAVSEA and this one-time event. NAVSEA's Rear Adm. (Sel) Paul E. Sullivan painted the artwork shown here that was reproduced for the special envelope. "I've been a watercolor amateur for a long time. I paint pictures of ships because I get inspired by what I'm working on," he told *Program Manager*. Employees of the Arlington, Va., U.S. Postal Service sold the stamps and provided the special cancellation.

Soon to be promoted, Sullivan has been assigned as the Deputy Commander for Integrated Warfare Systems, Naval Sea Systems Command. He leaves his successor, Navy Capt. John Heffron, a program that is on track, reasonably on cost, and on schedule.

How did he do it? By taking the lessons learned from another vessel, the *Seawolf*, which was discontinued after production of only three ships; expanding on its design, maximizing stealth, surveillance capabilities, and special warfare enhancements; and managing design and construction of a new, affordable yet potent submarine that is on track to deliver in 2004.

He would tell you any success he's enjoyed is due to endurance and being forthright enough to "tell it like it is." But that's only part of the story. His success is due in no small part to the fact that he is, quite simply, the right man, at the right time, in the right place, for the right job.

Program Manager recently interviewed Sullivan to bring our readers the program management perspective on a project that will affect how the Department of Defense conducts submarine operations and warfare for years to come.

Q

Before the Virginia Class, you were building an advanced attack submarine called the Seawolf – a program you also managed. Why was the Seawolf canceled?

A

The *Seawolf* was canceled due to very high cost. It was a very good submarine; I was the *Seawolf* program manager before I was the *Virginia* program manager, so I'm partial to that ship too. But, the *Seawolf* was cancelled in an era where the Soviet Union was putting out a new class of submarine almost every year, and their "quieting" was getting markedly better very rapidly. At that point, in the early '80s when the *Seawolf* program was put together, they had almost 400 submarines. The *Seawolf* was to go through, search at a very high rate of speed, and go after their SSBNs and their *Bastions*.

When that mission became de-emphasized at the end of the Cold War and all the other submarine missions came back as a more balanced mission (suite) as opposed to specific "go after SSBNs of the other side," the impetus for such an expensive, high-powered submarine was less. And I think when the Administration at the time reviewed it, they decided it wasn't worth the cost to the

country to go build 29 ships in that class. So they cut it all the way back to one, and then restored the second ship and finally the third ship.

We had two shipbuilders, each of which had backlogs in excess of 10 submarines on their books in 1990-1991, and they were looking at radically downsizing the shipyards and potentially going out of business, or at least one of them. In that environment, we realized we had to review not only what the submarine looked like, but also the process by which we built submarines.

Facing a potentially seriously low production rate, we had to go put together a submarine program that maintained as much combat capability as we possibly could, in particular stealth, but was affordable to the country so that we could build enough of them to eventually replace the *Los Angeles* Class. That's the whole impetus for the *Virginia* Class.

I went through DSMC's Program Management Course in the spring of 1994. From there I went to the Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, but was pulled out after only seven months to go run the *Seawolf* program. The *Seawolf* is very near and dear to my

heart. I was the deputy ship design manager as a lieutenant commander, so I actually was heavily involved in the design of the ship. And then to come back and deliver it years later as the program manager was a real eye opener.

Q Undeniably, you've got a big job — building the Virginia Class Attack Submarine, the first of four submarines whose use will impact our nation's naval forces over the next 20 years if not longer. For the benefit of our readers, would you give us a brief legislative review of the Virginia Class — when the program was conceived, why, and its progress through Congress to actual funding and contract start.

A It got started in the early '90s — 1991, 1992 — after the *Seawolf* was canceled and we were without an attack submarine program. And we realized at that point that the *Los Angeles* Class, of which we built 62 ships, would be slowly phasing out over the next 20 to 30 years.

The design started in 1996. The lead ship was authorized in 1998. So one ship was authorized in '98, one in '99 — we skipped a year — then there's an '01 ship and an '02 ship. We have a unique arrangement allowed by the FY 98 authorization language in that we could contract for all four of those ships, even before they were authorized. We couldn't spend money on any but the first ship, but they were all allowed to be contracted for, so they're all priced out.

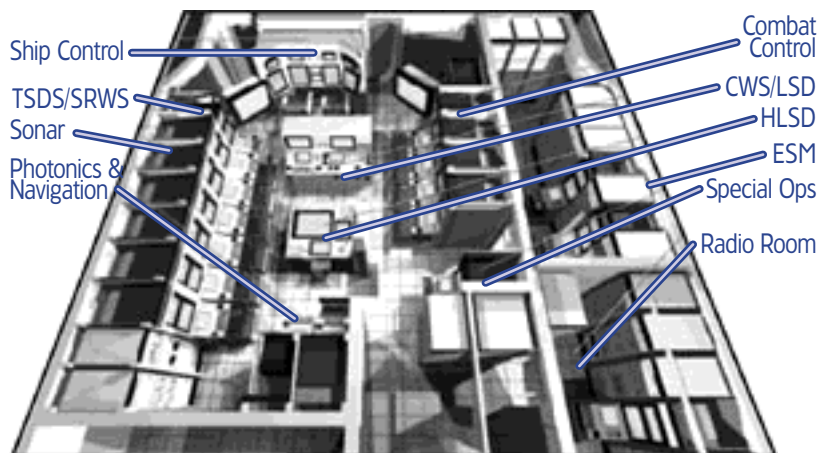
Q So you don't have to worry about going to Congress for more funding?

A We were allowed to contract for four ships, but the way we fund ships is unique. We fully fund them in the year of authorization. In essence, we contracted for four ships — three of which

Virginia's Electronic Surveillance Measures, or ESM suite is state-of-the-art. Collecting intelligence is one of its high-priority missions. Virginia's electronics processing will be the best in the submarine fleet.



Resembling a large gray whale, shown is an artist's conception of the Virginia (SSN 774) Class Attack Submarine.



The Command, Control, Communications and Intelligence (C3I) system module and all cabinets on the ship are designed for easy replaceability. The ship control system has a touch screen display on the ship control console.



It was a tough time for shipbuilders to go through the '90s where we [DoD] didn't order a submarine from 1991 until 1996, and then we ordered another one in 1998 after having gone all the way through the '70s and '80s at three to six orders a year. Our shipbuilders, particularly Electric Boat, were very nearly looking at going out of business at one point.

Q

How many NSSNs does DoD want over the long term?

A

We expect to build a class of 30. That's the program plan. And we ramp up to two per year in fiscal year '07, and then in fiscal year '09 we go to three per year.

Q

Does our nation have an ideal submarine force mix?

A

There will be four NSSNs out there in 2009. Then we have the ballistic missile submarine force — that's 18 *Ohio* Class. They're the large ballistic missile submarines. And then we have the *Los Angeles* Class — right now there are a total of 55 attack submarines at sea. That's almost entirely the *Los Angeles* Class. And there's one *Sturgeon* Class attack submarine still out there.

If you look at what the CINCs [Commanders in Chief] are asking for — we would need more attack submarines. At the height of the Cold War, we had almost 100 attack submarines. We've gone down to 55, so that's a greater force reduction in the submarine world than there was in other comparable forces.

There was a Joint Chiefs of Staff study done about two years ago. They did not query the submarine force — they queried the CINCs and asked, "What are the missions that you have, and how many submarines do you need by area for what your needs are?" There were exercises and intelligence gathering. The numbers came back that we need a force level of 68 attack submarines by 2015. I believe that by 2025 DoD would like

Artists's conception of the *Virginia* Class Attack Submarine. The *Virginia* is capable of carrying or piggy-backing an ASDS, or Advanced Seal Delivery System, a small 65-foot submarine that straps to its back.



were not yet approved. So we do, in fact, have to go to the Hill each year for each ship's money; but, once we get the money for that ship, we don't have to negotiate the contract with the shipbuilder — that's already negotiated. We just fund the contract line item.

Q

And your contractors are Electric Boat Corporation and Newport News Shipbuilding?

A

Our contractor is Electric Boat Corporation. Newport News Shipbuilding is a subcontractor of Electric Boat. They are teamed and they have a teaming agreement, but the contract I have is with Electric Boat. We had Milestone I in 1994, Milestone II in 1995, and we've been designing and building ever since. The design started in 1996 and the lead ship in 1998, and that lead ship delivers in 2004.

Construction Update Virginia Class

Virginia	51% Complete
Texas	38% Complete
Hawaii	9% Complete
N. Carolina	0.4% Complete

to see 76 attack submarines. This [study] was not done by the Navy. This was done by the Joint Chiefs.

Fifty-five, they said, was the rock bottom below which you would really be hurting the national missions. We participated somewhat in that study just from an information feed standpoint – how many ships could we build, and how many years would it take, and what would they cost. And that study threw out all of the nice-to-have missions, because there's not enough submarines to conduct them.

I'd have to say there need to be more [attack submarines], and we're looking at ways to see if we can ramp up to two attack submarines a year earlier.

Certainly the other thing on our horizon is the SSGN [nuclear powered cruise missile submarine] program where there will be four *Ohio* Class submarines identified for conversion to the cruise missile level. That's being worked in Department of the Navy right now. Certainly, that would enhance our force mix because they carry so many Tomahawks. We know that the SSGN is going to be a state-of-the-art submarine.



Let's talk capabilities. Can you tell us why the Virginia Class is better than its predecessor, the Seawolf? Let's start with advanced technology and the periscope design of the Virginia Class. In the aftermath of this year's Greenville accident, much speculation was focused on the periscope design. Could the periscope design of the Virginia Class have prevented that accident?



The *Greenville* is a late model *Los Angeles* Class submarine, and her periscope



Scaffolding surrounding SSN774 Sail at Norfolk Naval Station.

is a Type 18 attack periscope, which I have to tell you, is a pretty sophisticated piece of gear. The *Greenville* accident was due to an operational issue, not an equipment issue.

The photonics mask that we have on our ship [*Virginia*] really is a sophisticated television camera. Our equipment has high-resolution color, high-resolution black and white, and infrared. It also has a GPS [Global Positioning System] receiver.

The photonics periscope on the *Virginia* – that's a radical departure from what we're used to. And we have two of those on this ship. There is no conventional backup periscope for an optical look through the prisms and the tube in this submarine. So we have to make sure that those photonics periscopes work correctly.

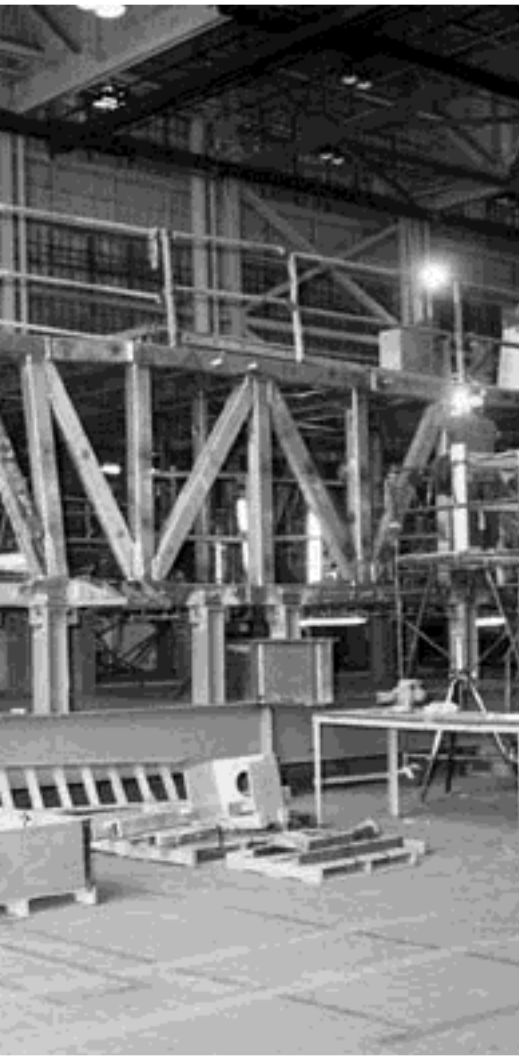
For that reason, we've sent a prototype of the *Virginia* periscope to sea on the *Annapolis* for two years. And the forerunner of the photonics periscope was at sea in other ships for a couple of years before that. These will be fully wrung out before we put them on this ship and make them operational.



On the subject of stealth, hasn't the advantage of stealth eroded considerably due to technological improvements of our potential adversaries' systems? Is it realistic to state that the sine qua non submarine attribute is acoustic stealth? Specifically, can the Virginia Class communicate without giving up stealth?



Stealth, particularly acoustic stealth, is a submarine's No. 1 reason for being. Once you go below the waves, the mere



threat of a submarine in an area is a powerful instrument of policy. When you take action in a submarine such as firing a torpedo, coming up to periscope depth to communicate, or taking other action, typically you give up a measure of that stealth in order to take the action. That's always been the case for all submarines.

Probably the best example I can give is the Falklands War, where the presence of one nuclear attack submarine from the UK [United Kingdom] Navy kept the entire Argentine surface fleet in port. A submarine is indeed a very powerful tool.

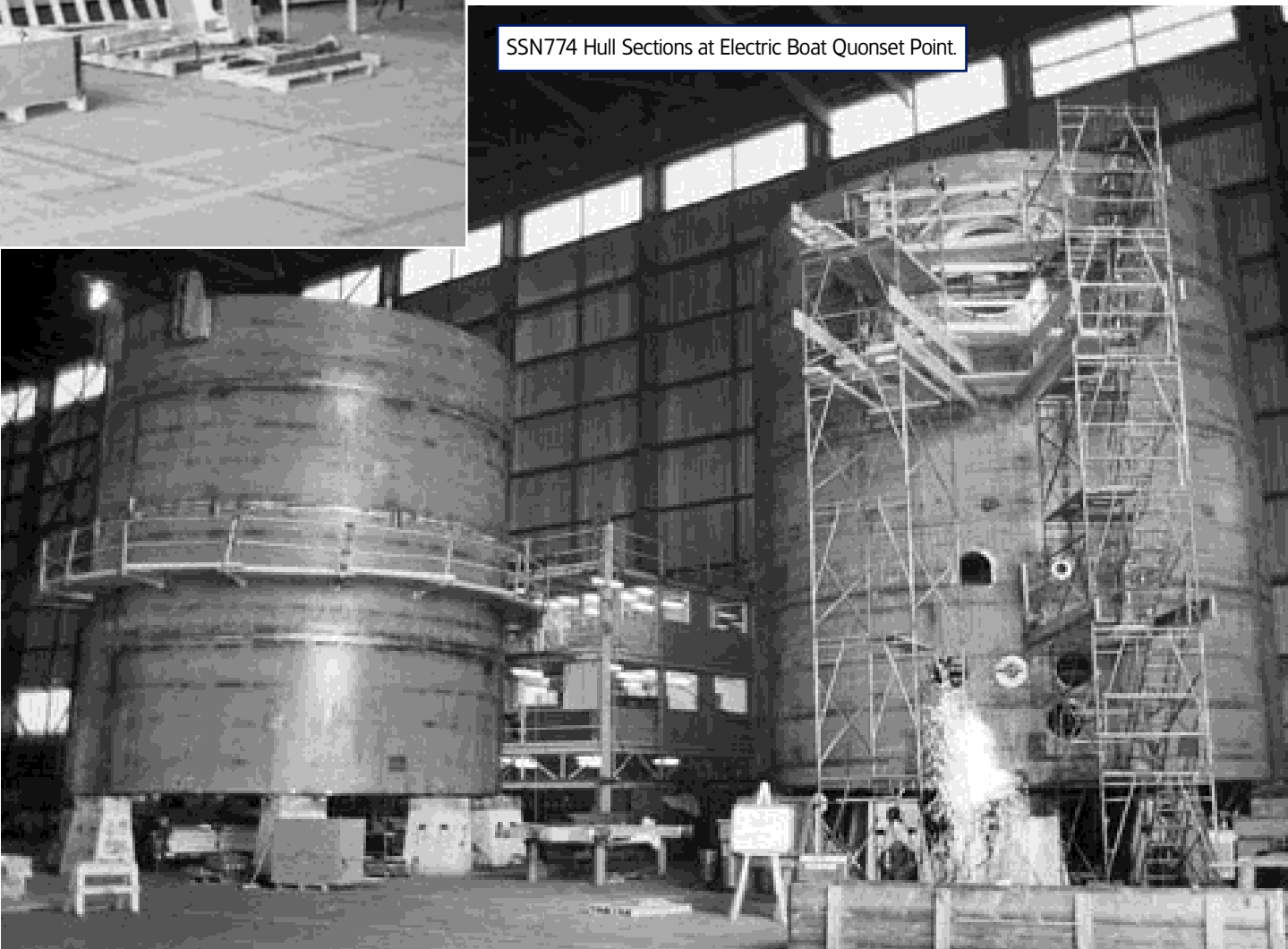
One of the *Seawolf's* reasons for being was the stealth margin between our ships and the rest of the world – we lost a lot of that margin because the rest of the world was rapidly catching up. The

Seawolf and the *Virginia* Class restored that margin of stealth.

As far as communicating, you can basically *receive* “until the cows come home” without giving up your position. If you want to *transmit*, certainly, that's an emission. But the way our submarines operate today, we would not just “pop up” any old place and transmit, nor would we stay on the air a long time. We transmit very quickly, jump down below the surface, and move out.

To get the *Seawolf*-like acoustic stealth on the *Virginia*, which is a smaller ship than the *Seawolf*, was a challenge. Fortunately, we were able to build on all of the developments and advancements from the *Seawolf* Class. And we have the next generation propulsor on our ship, which is very important for acoustic stealth.

SSN774 Hull Sections at Electric Boat Quonset Point.



REAR ADM. (SEL) PAUL E. SULLIVAN, USN PROGRAM MANAGER, VIRGINIA CLASS ATTACK SUBMARINE (PMS 450)

Rear Adm. (Sel) Paul E. Sullivan took command of the *Virginia* Class Attack Submarine Program (PMS 450) in September 1998 and served as Program Manager until August 2001. The *Virginia* Program is developing the Navy's premier nuclear attack submarines, which will replace the aging *Los Angeles* Class during the next few decades. During his tour, the contract for the *Virginia* Class Submarine Program was signed, construction was initiated on the first four submarines, and most of the *Virginia* design was completed. The lead ship of this anticipated 30-ship class – *Virginia* (SSN 774) – is on track to deliver in the spring of 2004.

Sullivan is a native of Chatham, N.J. He graduated from the U.S. Naval Academy in 1974 with a Bachelor of Science degree in Mathematics.

Following graduation Sullivan served aboard the *USS Detector* (MSO 429) from 1974 to 1977 as Engineering Officer, Operations Officer, and Executive Officer, and earned his Surface Warfare Qualification. He then attended the Massachusetts Institute of Technology (MIT), graduating in 1980 with dual degrees of Master of Science (Naval Architecture and Marine Engineering) and Ocean Engineer. While at MIT, Sullivan transferred to the Engineering Duty Officer (EDO) community.

His Engineering Duty Officer tours prior to command include Ship Superintendent, Docking Officer, Assistant Repair Officer, and Assistant Design Superintendent at Norfolk Naval

Shipyard, where he completed his Engineering Duty Officer qualification; Deputy Ship Design Manager for the *Seawolf* Class submarine at Naval Sea Systems Command (NAVSEA), where he completed his submarine qualification program; Associate Professor of Naval Architecture at MIT; *Ohio* (SSBN 726) Class and then *Los Angeles* (SSN 688) Class Project Officer at Supervisor of Shipbuilding, Groton, Conn.; Team Leader for Cost, Producibility, and Cost and Operational Effectiveness Assessment (COEA) studies for the New Attack Submarine at NAVSEA; and the Director for Submarine Programs on the staff of the Assistant Secretary of the Navy (Research, Development and Acquisition).

Sullivan served as Program Manager for the *Seawolf* Class Submarine Program (PMS 350) from 1995 to 1998. During his tenure, the *Seawolf* design was completed, and the lead ship of the class was completed, tested at sea, and delivered to the Navy.

Sullivan's awards include the Legion of Merit, the Meritorious Service Medal (four awards), the Navy Commendation Medal (two awards), and the Navy Achievement Medal.



But there's more than acoustic stealth. There's also electromagnetic stealth. The *Virginia* is, again, further development of what we put on the *Seawolf*.



Endurance — How long can it stay out? Under what conditions?



Our submarines normally stay out a couple of months. The actual number of days is classified. The limitation is food. We make our own water; we make our own oxygen; we make our own electricity; and the reactor is good for the lifetime of the ship. What limits us is

running out of food. And when you run out of food, you have to come in.



Tell us about Command and Control.



I'll lump Command and Control with Intelligence, Surveillance, and Reconnaissance. The big plus in this submarine is all the electronics. We made the step from militarized, ruggedized, Mil-spec-type, non-commercial electronic hardware to almost exclusively commercial off-the-shelf [COTS] hardware. Now, that brings with it a whole host of issues, but what it does allow you to do

is buy much more processing power for a much lower price. For example, we developed the Command and Control system for *Virginia* for one-fifth of the cost of *Seawolf*.



Using COTS parts?



Using COTS parts. And the shipset cost savings is about on the same order of magnitude. The whole combat system and the whole Command and Control system module and all of the cabinets on the ship were designed for easy replaceability. We have all the bells and

whistles that you could think of on the Command and Control system today, but we will be ready to upgrade as new items come to us in the future.

Our ship control system is also different because we're flying by joystick now as opposed to the yokes that you see in airplanes. We now have a touch screen display on the ship control console.

The combat system is impressive. Instead of having stand-alone or federated subsystems that may or may not talk to each other, we actually have 23 subsystems on this ship that all talk to each other over a wide area network. We've never done that on a submarine before. The first combat system module is in a test facility in Groton [Conn.], running and testing right now, three years before the ship delivers.

Certainly our Electronic Surveillance Measures, or ESM suite is state-of-the-art. Collecting intelligence is one of our high-priority missions. The *Virginia*, her sensor, the mast that comes out of the sail, and her electronics processing will be, again, state-of-the-art and they'll be the best in the submarine fleet. So that's an improvement.



Are our NATO counterparts and allies at all involved in development of the NSSLN?



Not to a high degree. We have data exchange agreements with the UK, in particular. We keep each other abreast of progress. They're building the *Astute* Class nuclear attack submarine. I would call it an interim development. They're also looking at the next generation beyond the *Astute*. We talk back and forth between the two countries, but they are not participating in this program as a joint partner.



How about Special Operations?



That's one area where we're markedly advanced in a couple of ways. First we can carry the ASDS, or Advanced Seal

Delivery System. This is a small submarine that will strap to the back of the *Virginia*. It's 65 feet long and it's testing out at Pearl Harbor right now.

The *Virginia* can also carry what's called the Dry Deck Shelter, which is an existing system that we use to lock out Seal swimmers. And they have smaller, mini submarines called Swimmer Delivery Vehicles that go in and out of that. It looks like a hanger. So we can go to sea with either the ASDS or the Dry Deck Shelter.

Inside the ship we have a nine-man lock-in/lock-out chamber that no other attack submarine has. We can lock out half a platoon of Seals in one lock-out cycle. So if you want to send an entire platoon of Seals to shore, two lock-out cycles and they're out of the ship.

The torpedo room is another example of an area where the ship is upgradeable. It's laid out with a center structure and then a side structure where we store all the weapons. On the *Virginia*, you can offload all the torpedoes and all their support structure. That leaves a big open space in the ship you can use for whatever you want. For example, you could berth up to probably 40 Seals in the torpedo room in Tokyo Hotel-style racks and store all their gear at the aft end of the room.

Or, if you wanted to load the submarine out with autonomous underwater vehicles, and run a long program of cycling them out through the torpedo tubes, you could do that with this torpedo room.



Is the Navy developing any kind of prototype before they actually commission the first NSSLN?



The first ship is the prototype. We have a saying in the Navy. "We can't send anything to sea in a submarine before we send it to sea in a submarine." We would not build a prototype submarine; that's why a lead ship of a class is so hard to get built – I speak from experience and

the tremendous difficulties building the *Seawolf* – because the lead ship is the prototype.

Instead, we test critical systems before we put them to sea. For example, the engine room. We used to use steam distilling plants on submarines. They were complicated, expensive, and hard to maintain. The commercial market in making fresh water went to reverse osmosis units, which are units like you would get for your house or put under your kitchen sink, that take water and filter it. They make great water. Basically, we built a prototype plant, and put it to sea on the *Hartford*. It works fine. The crew loves it. So we have two of them on the *Virginia*.

For the most part, we follow a strategy of prototyping the particular system, building the prototype system and then testing it. It is then ready for the Fleet. Once that's done, of course we shock test all the major components.



Would you comment on Virginia's strike capabilities?



The torpedo room on the *Virginia* is smaller than the *Seawolf's* torpedo room. The *Seawolf* can load out 50 weapons; *Virginia* can load out 38 weapons. So the difference comes in the fire rate. *Virginia* has 12 vertical launch tubes (forward) in the ship so we can salvo 12 Tomahawks quickly if we have to. The *Seawolf* does not have vertical launch tubes. She carries more weapons, but she can only salvo eight out of her eight torpedo tubes. So it's a question of quantity vs. timeliness. And each one has its advantages, so I would say the two ships are complementary.



Since the combat system of the NSSLN has been designed using mostly commercial off-the-shelf [COTS] equipment in an open architecture to accommodate technology insertion, isn't that forcing those charged with operating and maintaining the NSSLN to live "hand-to-mouth" in a shrinking industrial environment? How

will you turn a future of uncertain suppliers into a plus?

A Yes, there are negatives. But overall, it's a definite plus in the cost of development and buying a shipset. We have much cheaper up-front costs. However, we take the risk that after we build the first four ships and now we're going out to buy the shipset for the fifth ship – lo and behold, some of our suppliers are out of business.

With the commercial market as robust as it is, that doesn't bother us. The basic technology producers come and go. The problem emerges when you stick with a technology producer who goes down his or her own path and gets away from the bulk of the commercial market. Then you're in a technology corner. And you either stick with that vendor forever or you pay the price to jump to another technology – and maybe do some redesign along the way.

The bulk of our combat systems change frequently. Some of the technology turns over quickly, but some items like the radar aren't going to change a whole lot over the life of the ship. With items like the radar, you could probably stay with one vendor and be reasonably assured of a supplier. But for the bulk of the combat system, the hardware, the software, and the middleware are changing, so your contract has to be designed so that you can keep up with that.

It's a much more dynamic situation now. Today, technology refreshment is a part of your program; you have to be agile enough to make sure that you keep up with the technology. If I were only buying my four ships, I could probably do life-of-ship buys, keep all the computer cards on the shelf, and as they malfunctioned, just break them out of stock and go replace them. But I'm continuously buying more of the product.

It's a different way of doing business and there are pros and cons. The pro is that it's real easy to change. The con is you have to change.

Q Speaking in terms of milestones, where was the program when you took over in 1996 as far as what had been accomplished? And what can you point to that was accomplished during your tenure?

A My predecessor, Dave Burgess, was a genius – probably the best program manager the Navy had ever had for breaking ground on a new program. He led the team that won a Packard Award. I was the program manager who transitioned to construction. The design was about 50 percent complete; the acquisition Milestones I and II were well behind us.

The lead ship – the *Virginia* – is now 51 percent complete. There are pieces of submarine all over the place at Newport News and Electric Boat. As I mentioned earlier, the lead ship combat system module is in a test facility in Groton [Conn.], running and testing right now, three years before the ship delivers.

The second ship is 38 percent done, the third ship is really just started, and the fourth ship was authorized this year. We've done some prototype work on it. Building a submarine is like a three-dimensional jigsaw puzzle. It's staggering. It takes 8,000 construction drawings and about a million parts.

Q Are Electric Boat and Newport News Shipbuilding going to make that 2004 commissioning date for the *Virginia*? Will you be there?

A I certainly hope to be. It was pretty exciting commissioning the *Seawolf*. Yes, Electric Boat is on schedule. Both the first ship and the second ship are on schedule. Our track record at first delivery of class submarines is not very good, so the performance is a testament to the way Capt. Burgess set this program up. And my counterpart at Electric Boat – Fred Harris, who is a shipbuilding wizard – is keeping things on track and on schedule.

Q So the modeling and simulation were exceptionally realistic?

A On this program, yes. There are very few changes. With IPPD [Integrated Product and Process Development], we're seeing less than 25 percent of the waterfront design changes than we experienced in *Seawolf*. Now, with half the first ship built and 38 percent of the second ship built, we know that if you do this right and you do the 3-D model, it costs you up-front to go build this huge electronic database, but the construction on the waterfront compared to other classes of submarines is a breeze. You would never know you were building a lead ship – it's going that well.

Q Sounds like you're leaving your successor a program in pretty good shape.

A The technical and schedule aspects of the program are in great shape. And cost-wise, it's not in bad shape. Financing, however, is not in such great shape. I've spent the last four months explaining to people why, when you've budgeted a program assuming a 2 percent inflation rate and you've experienced a 7 percent in material costs overrun and 4-1/2 percent in labor costs inflation, the program is in trouble. There were a lot of budget cuts on this program early on. So it's underfinanced. It's a great program that's underfinanced.

Q Is there anything, in your view, that we at the Defense Acquisition University can do to enhance the acquisition education of the Navy's future program/project managers and program executive officers?

A There are two things. First, when major acquisition pieces of paper or legislation come out, it would be really nice (and I know the University tries to keep a roster of all the serving program managers) if they could put together talking points, something like "The instruction is 150 pages long, there were 248 changes to

it, but here's the page and a half of bullets you need to know about." That would be very helpful, because as a PM, you're always looking to what's going to bite you next. The second thing is this. There isn't anyone out there who knows the acquisition business – the pitfalls, the restrictions, the limitations, and the things that hurt us – better than the Defense Acquisition University staff and faculty. So I would like to see the school actually lobbying DoD for change. There's education, which is what your business really is, and then there's advocacy.

In my thought processes, you're the best educators on this acquisition process – you have a healthy turnover of staff, and you get people in who have worked the business. Who better to tell the OSD staff, "No, this is too restrictive; you really ought to go knock this off." For a program manager or a PEO to take on a regulation or a statutory restriction that needs help, that means you have to take time away from the program – you're already working 14 hours a day – to prepare and construct a position.

On the plus side, I get your "product" all the time. My people come back from DAU energized – they're ready to go, they know what they need to do. I think the product you're putting out is pretty good.

Q

What does a man in charge of building the world's mightiest submarine for the world's mightiest navy do for relaxation? Any future plans?

A

My kids would tell you I don't relax. But I am somewhat of the staff artist around here. I'm also into music and running.

Q

Looking at it from an outside observer's vantage point, the enormity of the responsibility for this program could certainly cause a few sleepless nights.

A

It's the second biggest program in DoD. In 2000 dollars, it's over \$60 billion. Yes,

I worry a lot, and at times I'm simply tired. I'm almost into my sixth year as a major program manager. That's probably too long. *Seawolf* was really rough and rocky — that was a very, very tough program to run. Taking on a second tour as the *Virginia* program manager has been both rewarding and challenging.

Q

You've been selected for promotion to rear admiral, so somebody is obviously paying attention to all that hard work. Where to from here?

A

As far as future plans, I've been assigned as the Deputy Commander for Integrated Warfare Systems, Naval Sea Systems Command. And I'll probably be leaving this position around the end of August.

Q

What's the best advice you ever received – be it from a relative, colleague, mentor, or friend – to prepare you for the job of PM?

A

A couple of things, and I try to teach this when I give classes. Integrity, honesty, leadership, and financial acumen are all important, but they are no good if you're so worn out that you can't think straight. So the number one attribute – and this is from a guy who's been doing this for six years – is physical endurance.

The second thing is total forthrightness. I'm always amazed at the reputations that program managers have on the Hill and with OSD staff that we fail to be forthright and honest on the true cost of our programs. Total forthrightness is the only way. Nora Slatkin, a former Navy Acquisition Executive, said that bad news doesn't improve with age. She probably didn't coin that phrase, but I agree with her thinking. I'd rather take it on the chin right off the bat if I've got a problem. I'd rather tell my chain of command, Congress, and the press upfront.

Q

As we conclude this interview, anything else on your mind or anything you'd like to add?

A

Right now the thing that's uppermost in my mind is, of the thousands of decisions I've made, have they all been made on the side of safety? The thing about submarines that's different from everything else is that when you lose one, it's like the Russian *Kirsk*. It's a national disaster.

When we certify a submarine to go to sea, particularly a lead ship (probably the hardest thing I've ever done is certifying the *Seawolf*), the program manager personally reviews all the waivers, all the nonconformances, and deviations from specifications. It's just like signing off that the Space Shuttle is ready to fly. It isn't just driving the aircraft carrier out on the ocean where, if everything breaks you just sit there for a while and can get towed back in. If something breaks at test depth, you're in a world of hurt in a couple of seconds.

The program manager and the program executive officer, with detailed intimate personal knowledge of the entire status from a safety viewpoint of that ship, sign and certify that that ship is ready to submerge. And then we climb aboard and take the first ride out. The acquisition system doesn't let up on you to prepare for that review; it takes months. So we spent a lot of Saturdays, Sundays, and nights working on every last detail of the *Seawolf*.

Certifying that lead ship was a very, very difficult, intense process. Even a guy who's certifying the Joint Strike Fighter ready to fly is able to expand that envelope gradually. The *Seawolf* we took to maximum depth, maximum speed on the first dive. I was aboard, along with the program executive officer and the four-star head of Naval Nuclear Reactors. *We're well motivated to get it right.*

Editor's Note: Sullivan welcomes questions or comments on this interview. Contact McGuiganjf@navsea.navy.mil.